

Monitoring Study Group Meeting Minutes

January 22, 2004

Howard Forest—CDF Mendocino Unit Headquarters Training Center

The following people attended the MSG meeting: Tharon O'Dell (BOF-chair), Richard Gienger (HWC/SSRC), John Munn (CDF), Dr. Ken Cummins (HSU), Dr. Mary Ann Madej (USGS), JB (USFWS), Dr. Richard Harris (UCB), Marc Jameson (CDF), Robert Horvat (CDF), Dennis Hall (CDF), Stephen Levesque (Campbell Timberland Management), Dave Longstreth (CGS), Angela Wilson (CVRWQCB), Ted Oldenburg (Hoopa Tribal Forestry), David Kuszmar (NCRWQCB), Leslie Markham (CDF), Duane Shintaku (CDF), Dr. Carolyn Hunsaker (USFS-PSW), Dr. Michael Wopat (CGS), Clay Brandow (CDF), and Pete Cafferata (CDF). **[Note: action items are shown in bold print].**

We began the meeting with general monitoring related announcements:

- Pete Cafferata announced that the Redwood Region Forest Science Symposium will be held on March 15-17, 2004 at the Double Tree Inn in Rohnert Park. A field trip will take place on March 15th. Topics include watersheds, genetics, regeneration, wildlife/fisheries, forest ecology, silviculture, policy, modeling, and forest health. Early registration ends February 11th (for more information, see: <http://www.cnr.berkeley.edu/forestry/redwood.html>).
- David Kuszmar and John Munn reported that the final version of the *Interagency Water Quality Monitoring Workgroup Summary Report* (dated December 16, 2003) is completed and available to interested parties. David and John gave a brief history of the issues, workgroup meetings, and workshop that contributed to the development of this report. The document defines both areas of agreement between the agencies, as well as obstacles to a consensus regarding monitoring. Electronic and hard copies are available from both CDF and the NCRWQCB.
- John Munn and David Kuszmar also summarized the continuing efforts of the MOU Monitoring workgroup, which is made up of state agency representatives, including the Regional Water Quality Control Boards, SWRCB, CGS, and CDF. The goal is to produce an agreement for monitoring the impacts of timber harvesting on water quality. The document is being drafted in sections, with varying degrees of completion for the different components. Parts of the document are expected to borrow language already agreed to in the *Interagency Water Quality Monitoring Workgroup Summary Report*. It is anticipated that a draft will be available in two months, with public involvement at that point.
- Richard Harris announced that the Salmonid Restoration Federation workshop on effectiveness and validation monitoring of restoration projects will take place on March 18, 2004 during the 22nd Annual Salmonid Restoration Conference in Davis (see the Salmonid Restoration Federation website for more information: <http://www.northcoastweb.com/srf/conference.html>). Richard also stated that he is working on a committee with NOAA Fisheries and DFG to develop a salmonid recovery monitoring plan, with the completed plan anticipated early next year.

Following these announcements, Dr. Mary Ann Madej and Dr. Ken Cummins provided an update on the progress of their study evaluating the composition of suspended load as a measure of stream health (a contract with CDF). Mary Ann began the presentation with a brief summary of the project. The objective of this two-year study is to establish the relative importance of size-specific, inorganic vs. organic components of the suspended load in influencing stream health, as reflected in the efficiency of feeding of juvenile salmonids and their invertebrate food base. Field sites are located in the Caspar Creek watershed (stations ARF in the North Fork and QUE in the South Fork) and in the Redwood Creek drainage (Prairie Creek above Brown Creek and Little Lost Man Creek). Suspended sediment and turbidity have been sampled in these watersheds for two years, and water samples have been analyzed for particle sizes and organic content.

The contribution of organic particles to the total suspended load has been found to be significant, especially during the rising and falling limbs of a hydrograph. Suspended organics also contribute greatly to turbidity during early fall storms. In general, as flow levels increase, the percentage of organics goes down. During low flows, organics often contribute a large percentage of the total load (e.g., 35 to 80% organic material *by weight*). Since organic particles are lighter than inorganic particles, 80% organics by weight equates to approximately 12 times as many organic particles compared to inorganic particles. Because organic particles have been found to cause a large part of light attenuation at lower flows, they can significantly impact fish feeding efficiency. Additionally, different gaging stations have been found to have different “signatures” for organic percentages at a given flow rate, due to the composition of tree species found in the riparian zones along the channels (i.e., hardwood vs. conifer).

Ken Cummins reported on the biological component of the project. Fish feeding efficiency has been evaluated in two ways—with direct field observation by snorkeling in the stream channels, and by observations made with flume experiments. Direct field observations were made up to 40 NTUs of turbidity (fish are no longer visible above 40 NTUs). Laboratory experiments were conducted up to 70 NTUs. Humboldt State University has 6 experimental channels where various levels of known turbidity (produced from bentonite and ground alder leaves) and 100 insects were presented to hatchery raised rainbow trout for 1-2 hours. Following the experimental period, fish stomachs were pumped to determine the number of insects captured. Fish feeding has been found to continue in the 40 to 70 NTU range, but feeding efficiency is reduced by 50% in this range. At 60 to 70 NTUs, few insects were found in the fishes’ stomachs, indicating low feeding efficiency. In the stream channels, most feeding has been found to occur during periods when turbidity is heavily influenced by organic-dominated suspended load (i.e., < 40 NTUs turbidity). Overall, feeding has been found to remain efficient up to 40 NTUs, with almost no feeding at 70 NTUs. Ken stated that the critical question for fish feeding efficiency is how long do turbidity levels remain elevated above 40 NTUs. This will be the first published research connecting known turbidity levels in stream channels and direct fish feeding efficiency measurements.

Ken stated that juvenile salmonids mostly feed on invertebrates that are located in the water column—almost never feeding on insects located on the bottom of the channel (20% surface, 80% middle, 0% bottom). Invertebrates, mainly behavioral drifters, are found in the water column at dusk and at dawn when the insects emerge and move to a

different life stage. Fish are conditioned to look for food at this time, knowing that insects will be in the water column. In all the seasons sampled in the field, the invertebrates predicted to be found in fish stomachs (i.e., behavioral drifters) were indeed found in the fish stomachs examined.

In streams with alder dominated riparian zones, organic material is processed through the food chain relatively rapidly (in the fall and winter—about 2 months after input), while in streams with conifer dominated riparian zones, organic material cycling takes considerably longer (to the spring and summer—up to 8 months after input). Rapid cycling of organic material translates to higher fish productivity.

In the discussion that followed, John Munn observed that this research illustrates that we may need to rethink suspended sediment sampling schemes so that both low flows and peak discharges are sampled adequately. Mary Ann stated that these types of concerns as well as equipment-related issues for turbidity (such as up to 80% differences in turbidity values depending on the instrument used, and how it is mounted in the stream) show the need for a focused workshop on turbidity monitoring. **John Munn suggested that the MSG should generate a white paper on how to implement a defensible instream monitoring program, including proper turbidity measurement.**

A final report on this project is expected this spring. A progress report dated December 19, 2003 was submitted to CDF. Mary Ann will present this research at the Redwood Region Forest Science Symposium (the abstract by M.A. Madej, P. Wilzbach, K. Cummins, C. Ellis, and S. Hadden is available online; see: http://www.cnr.berkeley.edu/forestry/redwood_paper35-madej.html). HSU Masters Theses by Colleen Ellis and Samantha Hadden will be finished this year.

Dr. Carolyn Hunsaker presented the MSG with a summary of the Kings River Experimental Watershed Project (KREW). The study began in 2000 with initial instrumentation installation and is expected to last approximately 15 years. The project is designed to quantify the variability in characteristics of headwater streams, and to evaluate the effect of fire and fuel reduction treatments on the riparian and stream physical, chemical and biological conditions. The study sites are located northeast of Fresno and just south of Shaver Lake, in the headwaters of the Kings River watershed, where second order streams have been instrumented in the Big Creek and Dinkey Creek basins. Currently, little flow, sediment, or water quality data exists for small streams in this area. Key questions used to design the study include: 1) how did fire interact with small stream systems before suppression, and 2) how can uneven-aged forests similar to that present prior to 1850 be created. The treatments that will be implemented are prescribed fire, mechanical thinning, and thinning with fire combined. The study hopes to help address Sierra Nevada Framework questions, including: 1) what are the effects of fire and fuel reduction treatments, 2) does prescribed fire decrease the rate of erosion, and 3) how effective are stream buffers at protecting small stream ecosystems. **The Kings River Experimental Watershed Project website has information on the study and it is anticipated that an updated study plan will be posted in February at: http://zimmer.csufresno.edu/~sblumens/KREW_INFO/KREW_Project.htm.**

The study design calls for 4 years of pretreatment data, 2 years for thinning and prescribed fire treatments, and 5-7 years of post-treatment data collection. There are 4 small watersheds in both the Big and Dinkey Creek basins. The experimental design has 1 control watershed, 1 with prescribed fire, 1 with mechanical thinning, and 1 with both fire and mechanical thinning in both the Big and Dinkey Creek watersheds. The Big Creek basin site is in the rain-on-snow zone and watershed sizes range from 120 to 327 acres. The Dinkey Creek site is higher (6000 to 7000 feet) and watershed sizes range from 131 to 562 acres. The control watershed for Dinkey Creek is Teakettle Creek, where some sediment and flow data was previously collected by the USFS (see: <http://teakettle.ucdavis.edu>).

The suite of physical measurements being collected includes: flow, channel characteristics, hillslope erosion, sediment loads, soil characteristics, meteorology, air quality, riparian microclimate, carbon budget, and fuel loads. Chemical measurements include: electrical conductivity, phosphorous, nitrate, ammonium, chloride, sulfate, calcium, magnesium, potassium, sodium, and pH. Biological measurements include: invertebrates (Spring sampling only), algae, and vegetation plots. Carolyn presented detailed information on sediment and flow data measurement techniques. Fiberglass parshall-Montana flumes with bubblers are being used for flow measurement, which is difficult in the winter with snow accumulations and freezing conditions. Small sediment basins are used to measure bedload and part of the suspended sediment load. Recording turbidimeters may also be installed. Hillslope erosion is being measured with sediment fences installed by Dr. Lee MacDonald of Colorado State University. A full suite of climatic data is collected at the weather stations installed for the project. Telemetry is functioning and sends real-time data from the gaging stations and weather stations to Fresno, reducing the amount of field checking.

Following lunch, we reviewed progress made on the three MSG/CDF/BOF cooperative instream monitoring projects. Stephen Levesque provided an update on the South Fork Wages Creek project located in western Mendocino County. A progress report dated January 15th from Graham Matthews and Associates was distributed to the group. All 5 sites have recording turbidimeters installed and 4 have pumping samplers, but both logistical and technical difficulties have been encountered. Problems have included sampling problems related to the size and shape of the channel at the sampling sites (i.e., small channels that are overly wide), electronic equipment failures, and access problems associated with fallen trees, bank slumps on roads, etc. At one site, a debris jam occurred in the channel just downstream of the gaging site, creating a backwater effect. It may be necessary to replace boulder weirs with small parshall flumes. Stephen stated that the storm sampling personnel requirements were initially underestimated and will be reevaluated. He has spoken to HSU about the possibility of having graduate students implement a biological component to the project. **Stephen offered the study site and the CTM conference room for a possible future MSG meeting. It was decided that this would be best in the late Spring, when access to the field site is improved.**

Pete Cafferata updated the group on work completed for the new Garcia River Cooperative Instream project. The main cooperators are CDF/BOF/MSG, NCRWQCB, MCRCD, MRC, the Maillard Ranch, and Pioneer Resources. The study plan is posted at: http://www.bof.fire.ca.gov/board/garcia_final_comments.pdf. Five stations have

been established and are located at: mainstem Garcia near Eureka Hill Bridge, SF Garcia near Fish Rock Road, Whitlow Creek, Mill Creek, and Pardaloe Creek. Continuous recording turbidimeters are installed at all stations, as are pressure transducers for flow measurement. Suspended sediment measurements are taken manually with grab samples. Teri Jo Barber, working for the MCRCD as the lead person for the project, reports that data has been successfully downloaded for all stations, except the mainstem, where the borrowed pressure transducer from FROG has not provided useful information. **Pete also reported that Dr. Cajun James of SPI is actively searching for a field site for the SPI cooperative project.**

A brief summary of the Water Quality Monitoring Workshop held in Redding on December 1-2, 2003 was presented by Pete Cafferata, as well as a 3 page handout previously provided to the BOF in December. The workshop was co-sponsored by the UC Center for Forestry and CDF, and was organized by Dr. Cajun James. Abstracts from all 18 speakers are available at: <http://ucce.ucdavis.edu/files/filelibrary/5098/12537.pdf>. Feedback from participants at the conference has been very positive.

Our next agenda item was a discussion of anticipated MSG/CDF monitoring activities for calendar year 2004. A one-page handout summarizing the projects was provided. Clay Brandow described what is anticipated for the Modified Completion Report monitoring project. CDF will continue to randomly sample 12.5% of completed THPs with CDF Forest Practice Inspectors, evaluating randomly located road and WLPZ segments, as well as watercourse crossings. **A database is being developed in-house by CDF called CRAWDAD (Canopy, Road, and Watercourse Crossing Data Analysis Database) and an updated PowerPoint presentation with current data will replace the existing PowerPoint presentation on the MSG website in February (see the following website for summarized data collected through August 2003: <http://www.bof.fire.ca.gov/pdfs/BOFMSGMCREarPrelAnaly2003-08-11.pdf>).** Canopy measurement results from 250 THPs continue to be very similar to that reported on earlier with 210 THPs. Potential CDF Forest Practice Program staff reductions may threaten CDF's ability to continue to collect this monitoring data.

Several other monitoring related projects will occur in calendar year 2004. The three cooperative instream monitoring projects described above (i.e., the South Fork Wages Creek Project, the New Garcia Project, and the SPI Cooperative Project) are a key component of 2004 monitoring activities. The Hillslope Monitoring Program (HMP) is currently on hold, due to lack of funding associated with the State's budgetary deficit. A preliminary outline has been developed for restructuring the HMP to emphasize areas harvested under the Threatened and Impaired Watersheds Rule Package. Watercourse crossing training has been identified as a critical need, based on past HMP monitoring results. **A final version of the CDF Report titled *Designing Watercourse Crossings for Passage of 100-year Flood Flows, Wood, and Sediment* (by P. Cafferata, T. Spittler, M. Wopat, G. Bundros, and S. Flanagan) will be available in February and a presentation to NCRWQCB staff is planned for February 27th by Dr. Michael Wopat and Pete Cafferata. Additional watercourse crossing training is anticipated in 2004—both with live and on-line recorded presentations. Also, a LTO/RPF guidance document for crossings and road drainage structures is planned to be developed this year, based on a**

recommendation included in the 2002 HMP report. An In-house effort is envisioned, with possible assistance from Mr. Ed Ehlers of Associated California Loggers.

Finally, John Munn reported that funding for both the North and South Forks of the Caspar Creek watershed study has been approved for 2004. The watershed research project at Caspar Creek has the longest detailed record of storm flow and sediment production from forested watersheds in California and on the West Coast of the United States and is the primary source of information about impacts and recovery from timber harvesting operations in Coast Range environments. There will be continued collection of background calibration data needed to evaluate the impacts of future management activities in the South Fork watershed. **Four Caspar Creek research papers will be presented at the Redwood Region Forest Science Symposium in March 2004 (Keppeler, Lewis, Reid and Lewis, Madej and others).** Abstracts for the four papers are available at the following website:
http://www.cnr.berkeley.edu/forestry/redwood_schedule.htm.

Pete Cafferata provided the MSG with an updated version of the Draft MSG Instream Monitoring Projects—Goals and Objectives document that had been previously reviewed by the MSG at the last meeting in October. Many suggested improvements provided at that meeting were incorporated in the new draft. One addition stated that *“MSG staff shall attempt to locate and secure stable, long-term sources of funding for MSG instream monitoring projects.”* **Duane Shintaku of CDF suggested that this bullet point should be moved to the top of the list, since securing stable funds is critical with the shortage of operating dollars CDF currently faces. Duane stated that we need to make a concerted effort to determine what funding is available from the outside sources (grants, endowments, etc.).**

During the new and unfinished business and public comment agenda items, Richard Gienger reminded the group that we had previously agreed that it would be beneficial to have a field MSG meeting to review different aspects of watercourse crossings. **It was again agreed that this is a good idea and staff will investigate possible field sites for a potential Spring or Summer meeting.** Additionally, Richard commented that he believes the Sierra Club proposal to have Work Completion Reports filled out by RPFs for plans in coho salmon watersheds would provide greater assurance that the Forest Practice Rules and additional plan requirements were implemented correctly. Duane Shintaku replied that CDF has participated in the coho recovery process and that CDF is not opposed to the concept of post-harvest documentation in coho watersheds. CDF is supportive of an interdisciplinary “team approach” of agency and/or non-agency personnel reviewing THPs following the completion of harvesting, leading to a greater degree of confidence by all the resource agencies, but CDF is not comfortable tying this effort to the legally required Work Completion Report process. Two main questions could be addressed with this approach: 1) did the LTO comply with the Forest Practices Act, and 2) did the coho-related THP mitigations in the plan accomplish what were anticipated to benefit this listed species.

The next MSG meeting was tentatively scheduled for the week of March 22nd, but will have to be rescheduled due to a conflict with a previously arranged training session for the Howard Forest Training Center. Pete Cafferata will send out an email message indicating the date of the next MSG meeting when it is known.